

Application No. 10/075,035
Amendment dated August 16, 2005
Reply to Office Action of June 15, 2005

Amendments to the Specification:

Please replace the paragraph beginning at page 1, line 4, with the following rewritten paragraph:

This application is a continuation-in-part of U.S. Patent Application Serial No. 09/522,152, filed March 9, 2000, now U.S. Patent No. 6,669,913, and a continuation-in-part of U.S. Patent Application Serial No. 09/851,300, filed May 8, 2001, now U.S. Patent No. 6,776,814, both incorporated herein by reference. The '300 application is a continuation-in-part of the '152 application.

Please replace the paragraph beginning at page 1, line 28, with the following rewritten paragraph:

Reference is also made to commonly owned co-pending companion U.S. Patent Application Serial No. 10/075,036, filed on even date herewith, ~~Atty-~~
~~Docket No. 4695-00010~~, now abandoned, incorporated herein by reference, which relates to exhaust aftertreatment emission control regeneration.

Please replace the paragraph beginning at page 9, line 29 with the following rewritten paragraph:

Pleated media or corrugated pleats 110 and sheet 108 of the filter are composed of regenerable material, for example ceramic material as in U.S. Patents 4,017,347, 4,652,286, 5,322,537, and preferably of a high temperature composite ceramic material as disclosed in commonly owned co-pending U.S. Patent Application Serial No. 09/573,747, filed May 18, 2000, all incorporated herein by reference. The filter is regenerated by heat, as applied by a separate gas burner, electric resistance heating, microwave energy, etc., for example as disclosed in U.S. Patents 5,014,509, 5,052,178, 5,063,736, all incorporated herein by reference.

Please replace the paragraph beginning at page 10, line 8 with the following rewritten paragraph:

Corrugated central section or inner central section 142 of the filter roll provides additional support, which is preferred over merely leaving such central section hollow, to provide a get-home feature for a truck even if the filter clogs. In addition, the starting run of pleated media 110 at 190, Fig. 6, along the span between starting side 118 and the beginning of sealing beads 112, 114, may be coated with an oxidation catalyst material, as in the noted parent '152 application, to reduce volatile organic fraction (VOF) particulate, and to act as a heater core to initiate soot light-off during operation. Central inner section 142 of the filter roll acts as a flow-through oxidation catalyst when a precious metal is applied to the pleats at 190. The particulate passing through this section would not be eliminated, but there would be reduction by oxidation of the volatile organic fraction. The added catalyst treatment may or may not be desired or needed depending upon application, such as whether the flow needs to be reversed such as in Fig. 10 for packaging or space requirements. The exothermic reaction occurring in central inner section 142 can act as a core heater to initiate filter regeneration. Upon addition of the catalytic treatment, a combination catalytic converter and filter is provided for internal combustion engine exhaust, including a first catalytic section or inner central section 142 treated with a catalyst for the exhaust, and a second filter section or outer annular section 148 with alternately sealed flow channels 136, 138 forcing exhaust to flow through the pleated filter media. In Fig. 9, the sections are in parallel such that a first portion 160 of the exhaust flows through catalytic section 142 and is catalyzed thereby, and a second portion 156 of the exhaust flows through filter section 148 and is filtered thereby. The exhaust flow through catalytic section 142 is unfiltered. In Fig. 9, housing inlet 176 supplies engine exhaust to both sections 142 and 148, and housing outlet 178 receives exhaust from both sections 142 and 148 including a first catalyzed exhaust portion 162 and a second filtered exhaust portion 158. In Fig. 10, sections 142 and 148 are in series such that engine exhaust flows serially through each. In Fig. 10, housing inlet port 186 supplies engine exhaust to section 142, and housing outlet

port 180 receives engine exhaust from section 148, the exhaust at outlet 180 being both catalyzed and filtered.

Please replace the paragraph beginning at page 11, line 11 with the following rewritten paragraph:

Figs. 11-13 show an exhaust aftertreatment combined filter and catalytic converter or device 202 for treating exhaust as shown at arrow 204, for example from an internal combustion engine such as diesel engine 206. Device 202 has a plurality of flow channels 208 each having both: a) a flow-through channel 210, Fig. 13, catalytically reacting with the exhaust; and b) a wall-flow channel 212 trapping particulate. Exhaust aftertreatment combined filter and catalytic converter 202 is preferably provided by a plurality of sheets 214, 216, 218, 220. As in the above noted parent '152 application, one of the upper or lower boundary layers or sheets 214 or 220 may be eliminated when the device is wound in a spiral wrap, Fig. 14, because the remaining layer provides the boundary for the channels on the opposite sides thereof. Likewise in a stacked structure with a plurality of rows and columns of channels, one of the boundary layers 214 or 220 may be eliminated because the remaining layer will provide a boundary layer for the channels on the opposite sides thereof, e.g. if top layer 220 is omitted, then layer 214 of the second row of channels will provide the bottom wall for such second row of channels and will provide the top wall for the first row of channels therebelow.

Please replace the paragraph beginning at page 17, line 23 with the following rewritten paragraph:

The disclosed exhaust aftertreatment combined filter and catalytic converter is preferably provided by a plurality of sheets, at least one of which comprises filter media, preferably at least the third sheet 218 or 304 or 320, and further preferably all of the noted sheets. The first and second sheets 214 and 216 define a plurality of flow channels 208 having various portions catalytically treated and providing a plurality of flow-through

channels 211, 212, 210, Fig. 13, 362, 332, 364, Fig. 17, passing exhaust therethrough and catalytically reacting therewith. Channels 212 and 332 additionally provide wall-flow channels axially overlapped with the respective flow-through channels, i.e. the wall-flow channels and the flow-through channels have sections which overlap each other along their axial length, e.g. ~~212, 210, 332, 364~~ 212a, 210a, 332a, 364a. The third sheet 218 or 304 or 320 defines with at least one of the first and second sheets the noted plurality of wall-flow channels 212 or 332, passing the exhaust through the third sheet and trapping and storing particulate such as soot thereat.

Please replace the paragraph beginning at page 18, lines 8 with the following rewritten paragraph:

In the preferred embodiment, at least second sheet 216 is catalytically treated, and at least third sheet 218 or 304 or 320 is a filter media sheet. In further preferred embodiments, all of the sheets are filter media sheets and all of the sheets are catalytically treated. Third sheet 218 or 304 or 320 is preferably treated on both sides thereof, namely both the upstream facing side and the downstream facing side, as above described. In each of the embodiments, plural catalytically treated serially sequential surfaces are provided along which exhaust flows. For example, in Figs. 13 and 15, exhaust flows firstly along first sequential catalytically treated surfaces 286 at faces 274, 278, then secondly along second sequential catalytically treated surfaces 288 at faces 276, 280, then thirdly along third sequential catalytically treated surfaces 290 at faces 282, 284. In Fig. 15, exhaust flows along sequential catalytically treated surfaces 292, and then along sequential catalytically treated surfaces 294. In Figs. 17 and 19, exhaust flows along sequential catalytically treated surfaces 366, then along sequential catalytically treated surfaces 368, then along sequential catalytically treated surfaces 356 at faces 344, 348, then along sequential catalytically treated surfaces 358 at faces 346, 350, then along sequential catalytically treated surfaces 358 at faces 352, 354. The combination of the flow-through channels and the wall-flow channels have plural catalytically treated surfaces in axially overlapped channel sections, for

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example axially overlapped channel sections ~~212, 210~~ 212a, 210a, in Fig. 13, and axially overlapped channel sections ~~332, 364~~ 332a, 364a in Fig. 17.